MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE.

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INTRODUCTION.

The MONTHLY WEATHER REVIEW for April, 1901, is based on reports from about 3,100 stations furnished by employees and voluntary observers, classified as follows: regular stations of the Weather Bureau, 159; West Indian service stations, 13; special river stations, 132; special rainfall stations, 48; voluntary observers of the Weather Bureau, 2,562; Army post hospital reports, 18; United States Life-Saving Service, 9; Southern Pacific Railway Company, 96; Canadian Meteorological Service, 32; Mexican Telegraph Service, 20; Mexican voluntary stations, 7; Mexican Telegraph Company, 3; Costa Rica Service, 7. International simultaneous observations are received from a few stations and used, together with trustworthy newspaper extracts and special reports.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Mr. Curtis J. Lyons, Meteorologist to the Hawaiian Government Survey, Honolulu; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Mr. Maxwell Hall, Government Meteorologist, Kingston, Jamaica; Capt. S. I. Kimball, Superintendent of the United States Life-Saving Service; Commander Chapman C. Todd, Hydrographer, United States Navy; H. Pittier, Director of the Physico-Geographic Institute, San Jose, Costa Rica; Captain François S. Chaves, Director of the Meteorological Observatory, Ponta Delgada, St. Michaels, Azores, and W. M. Shaw, Esq., Secretary, Meteorological Office, London. Rev. Josef Algue, S. J., Director, Phillipine Weather Service.

Attention is called to the fact that the clocks and self-registers at regular Weather Bureau stations are all set to seventy-fifth meridian or eastern standard time, which is exactly five hours behind Greenwich time; as far as practicable, only this standard of time is used in the text of the REVIEW, since all Weather Bureau observations are required to be taken and recorded by it. The standards used by the public in the United States and Canada and by the voluntary observers are believed to conform generally to the modern international system of standard meridians, one hour apart, beginning with Greenwich. The Hawaiian standard meridian is 157° 30′ or $10^h\ 30^m$ west of Greenwich. Records of miscellaneous phenomena that are reported occasionally in other standards of time by voluntary observers or newspaper correspondents are sometimes corrected to agree with the eastern standard; otherwise, the local standard is mentioned.

Barometric pressures, whether "station pressures" or "sea-level pressures," are now always reduced to standard gravity, so that they express pressure in a standard system of absolute measures.

FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

Forecasts of wind and weather for the first three days out of steamers bound east from United States ports were made daily during the month and published on the weather maps issued in Washington, Baltimore, New York, and Boston.

Three important disturbances appeared over the United States during the month. The first of these occupied the west Gulf coast on the morning of the 1st, and moved thence to the middle Atlantic and New England coasts by the 4th, its passage being attended on the 3d by gales of 40 to 50 miles an hour from Hatteras to Eastport. The second traversed the United States from the north Pacific to the middle Atlantic coasts from the 1st to the 6th; thunderstorms occurred from Texas to the Ohio Valley, and northeast shifting to northwest gales over the Great Lakes, during the 5th; high easterly shifting to north and northwest winds prevailed on the middle Atlantic and New England coasts during the 6th and 7th. The third assumed definite form over Texas on the morning of the 17th, moved thence eastward over the Gulf States during the 18th, recurved northeastward over the South Atlantic States during the 19th, reached the Middle Atlantic States on the 20th, from which region it drifted westward over the Ohio Valley and dissipated. The rain which attended this disturbance was heavy, and in the Ohio Valley the rain which began on the 18th and continued through the 21st resulted in destructive floods. A detailed description of these floods will be found under the heading Rivers and Floods. The character and value of the warnings which were issued by the Weather Bureau in connection with the floods are indicated by the following editorial in the St. Louis, Mo., Republic of May 7, 1901:

HONOR IS DUE.

Hereafter it may be assumed that the Weather Bureau man will be held in high esteem throughout the Ohio Valley. During the flood period now gradually closing millions of dollars have been saved through the warnings that have been given by this branch of the Government service.

It is so seldom that the Weather Bureau receives credit for correct forecasts that the widespread commendation for the timely warnings that have been given the people of the inundated section is notable. So accustomed have the people become to observing the mistakes of the Weather Bureau that the almost universal regard which the public really feels for the service is seemingly hid beneath showers of good natured banter.

That any talk of abolishing the service should ever have been seriously considered seems utterly preposterous. The actual amount saved to the people through the warnings given in the great flood is a thousand times more than the annual cost of the service. All praise to a department that is too often slighted.

From the 12th to the 16th heavy snowstorms occurred in the middle Rocky Mountain districts, and from the 19th to the 23d snow fell in the mountains of eastern Tennessee, eastern Kentucky, Virginia, West Virginia, and Pennsylvania.

Frequent damaging frosts in the North Pacific States, were, as a rule, accurately forecast. In the central and northern counties of California fruit was damaged by cold, dry weather.

CHICAGO FORECAST DISTRICT.

Advisory messages were sent to open ports on the upper Lakes on the 1st and 4th, and to Lake Michigan and Lake Huron ports on the 16th, to the effect that the wind would become brisk to high. On the 20th, 21st, and 22d warnings for high north to northeast winds were issued in connection with a condition seemingly dangerous to navigation, the condition being a storm of steep gradient entering from the British Northwest, while an area of high pressure and cold air overlay the Lake Superior region, and at the same time a severe storm was central on the middle Atlantic coast with a steep gradient extending northwest nearly to the lower lakes. Fresh to brisk northeast winds obtained generally over the upper lakes, and high northeast over Lake Michigan.

In anticipation of the unseasonably cool weather which overspread the district from the 16th to 19th, frost warnings were issued to such sections as would be liable to suffer injury by heavy frost or freezing weather.—*F. J. Walz, Forecast Official.*

SAN FRANCISCO FORECAST DISTRICT.

The month was as a whole unusually dry. This dry condition, it is believed, was largely brought about by the prevalence of an area of high pressure from British Columbia to Alberta.

Southeast storm warnings were displayed along the coast early on the morning of the 29th. While not technically justified at the most southern points of display, it is believed that reports from incoming vessels will show that the conditions at sea were such as accompany a moderate southeaster.—*A. G. McAdie, Forecast Official.*

PORTLAND, OREG., FORECAST DISTRICT.

The month was unusually cool and damaging frosts occurred frequently. The frosts were as a rule accurately forecast. No damaging storms occurred inland, but several were reported along the coast, the more severe of which took place on the 1st and 28th. Storm warnings were ordered hoisted at stations nearest the coast in advance of both of these storms, and information of their character sent to inland points.—*E. A. Beals, Forecast Official.*

HAVANA, CUBA, FORECAST DISTRICT.

But one warning was issued. This warning was received from Washington and was worded as follows:

WASHINGTON, D. C., *April* 18, 1901, 11 *a. m.*

Storm center near Mobile moving east; Strong east to southeast winds will shift to-night to northwest on north Cuban coast with lower temperature.

This warning was sent to all Cuban north coast stations and to Santiago, and was very fully disseminated. It was fully verified and much appreciated, for, although the registered wind velocity did not exceed 28 miles an hour, very high seas continued during the 19th, 20th, and 21st. The forecast was highly commented on for its accuracy by the governor general, the captain of the port, and a number of prominent army officers at the governor general palace, the governor general having been prevented from taking a trip in his steam yacht to Miami en route to Washington by the high seas running. A number of expressions of the value of the warning were received from agents of steamship companies.—*W. B. Stockman, Forecast Official.*

AREAS OF HIGH AND LOW PRESSURE.

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long. W.	Length.	Duration.	Daily.	Hourly.
High areas.		°	°		°	°	*Miles.*	*Days.*	*Miles.*	*Miles.*
I	2, a.m.	32	107	3, p.m.	37	87	1,300	1.5	867	36.1
II	4, a.m.	38	123	6, p.m.	39	95	1,550	2.5	620	25.8
III	5, p.m.	50	97	13, p.m.	41	70	3,150	5.0*	630	26.2
	6, p.m.	40	124				1,650	2.5†	660	27.5
IV	12, a.m.	53	122	13, p.m.	50	97	875	1.5	583	24.3
V	25, p.m.	40	124	29, p.m.	39	75	3,075	4.0	769	32.0
Sums							11,600	17.0	4,129	171.9
Mean of 6 paths							1,933		688	28.7
Mean of 17 days									683	28.4
Low areas.										
I	1, a.m.	53	122	4, a.m.	50	100	1,400	2.0*	700	29.2
II	3, p.m.	41	105	7, a.m.	41	70	2,950	3.5	843	35.1
				6, p.m.	37	75	2,900	2.7	1,074	44.8
III	4, a.m.	49	123	7, a.m.	53	105	1,075	2.0*	538	22.4
IV	9, p.m.	32	107	13, a.m.	37	90	1,465	3.5	419	17.5
				16, p.m.	32	65	3,900	6.0*	650	27.1
V	15, p.m.	38	100	17, a.m.	48	85	1,100	1.5	733	30.5
VI	16, p.m.	32	107	22, a.m	39	85	2,750	5.5	500	20.8
VII	22, a.m.	49	123	24, a.m.	53	105	925	2 0	462	19.2
VIII	22, p.m.	32	86	25, a.m.	41	70	1,250	2.5	500	20.8
Sums							19,715	31.2	6,419	267.4
Mean of 10 paths							1,972		642	26.7
Mean of 31.2 days									632	26.3

* Stationary for 1 day. † Stationary for 3 days.

RIVERS AND FLOODS.

Two floods in the Ohio River, one of them almost unprecedented for the season, were the principal occurrences of interest during the month. The first rise, which resulted from heavy rains over the watersheds and valleys of the Allegheny and Monongahela rivers, began on the 3d, and on the 8th the water reached the danger line at Pittsburg, Pa. The decline of this flood at Pittsburg was as rapid as had been its rise, and the danger stage was maintained less than a day. As the crest passed down the river, high readings were reported from all points between Pittsburg, Pa., and Cairo, Ill., but no damage resulted, and the danger line was not reached, except at the first named place. Concerning this flood the Weather Bureau Official at Pittsburg reports as follows:

PITTSBURG, PA., APRIL 23, 1901.

On the morning of the 3d instant a very heavy snowfall, from 12 to 15 inches, seriously crippled the telegraph and telephone communications, and practically no reports were received on the 3d, very few on the 4th, and they were generally delayed and unsatisfactory until the morning of the 7th instant, when Freeport and Lock No. 4, the two most important stations, were still missing. Owing to this state of affairs it was very difficult to keep track of the upper river conditions, and I had to surmise what the precipitation and fluctuations were on the Allegheny and Monongahela rivers for a distance of over 100 miles from Pittsburg. Meanwhile the rivers continued to rise slowly at Pittsburg, and on the morning of the 7th instant, reached a stage of 20.7 feet, 1.3 feet below the danger line. Considering the reports of the